Future Opportunities, Future Challenges
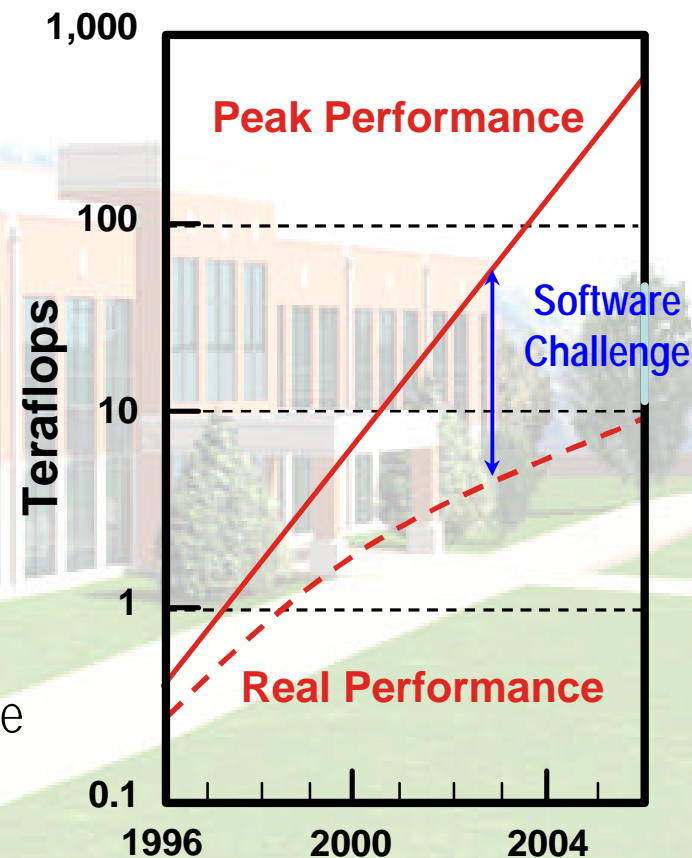
Peak Performance is skyrocketing

- In past 10 years, peak performance has increased 100x; in next 5 years, it will increase 1000x

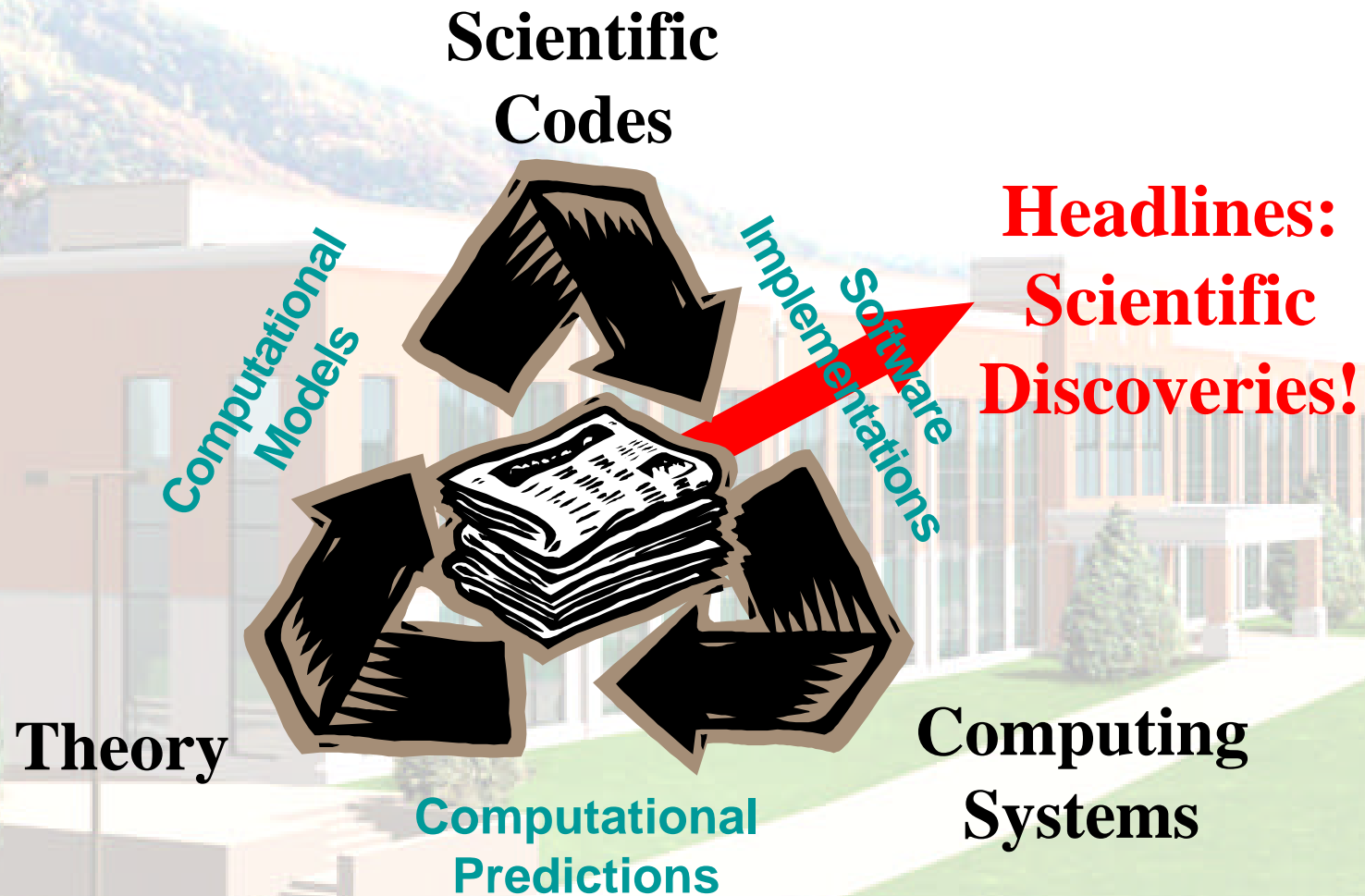## Real Performance is increasing, but ...

- Efficiency has declined from 40-50% on vector supercomputers of 1990s to as little as 5-10% on parallel supercomputers of today

Research challenge is software

- Scientific codes to model and simulate physical processes and systems

- Computing and mathematics software to enable use of advanced computers for scientific applications

- Continuing investments as computer architectures undergo fundamental changes

Advancing Scientific Discovery

Scientific Codes

Headlines: Scientific Discoveries!

Computational Models

Software Implementations

Theory

Computational Predictions

Computing Systems

Advancing scientific discovery through computation requires continuing investments in theory, scientific codes, and computing systems, coupled with validation of computational predictions.